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ABSTRACT

This paper discusses the success of methods used in the community to increase immunization levels among children. Using a population-wide model, data were obtained from a combined, city-county health department in Missouri. While the methods used by free school clinics and public clinics were found to be effective methods in promoting immunization, the use of public service media was found to be ineffective. Data was also obtained from a high risk group model, in order to assess methods used to increase immunization levels among low socioeconomic class preschool children. It was found that the susceptibility reporting and appointment arranging procedures which had been successful with school-age children resulted in immunizations for only 10% of the preschoolers sampled. Caution is suggested when evaluating the potential success of methods to increase patient compliance and alternative methods for the future are explored. (Author/MP)

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Primary Prevention and Compliance Toward Childhood Immunizations

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Abstract

Immunization for disease is an important example of primary preventive health care for children. However, recent surveys have revealed an alarming decrease in the number of children fully protected by immunizations. Data from a combined city-county health department are used to describe methods such as free school clinics and clinics during epidemics which have been effective and methods such as public service media campaigns which have been ineffective in promoting immunization obtaining, using a population-wide model of primary prevention. A high risk group model is also presented which considers methods of increasing immunization levels among low socioeconomic class preschool children, and it is noted that the susceptibility reporting and appointment arranging procedures which had been successful with school children resulted in immunizations for only 10% of the preschoolers sampled. Caution is suggested when evaluating the potential success of methods to increase patient compliance and alternative methods for the future are suggested.

Primary Prevention and Compliance Toward Childhood Immunizations

Although the past centry has heralded the possible eradication of sometimes fatal childhood diseases through the use of appropriate vaccines[1] the 1973 National Immunization Survey noted a significant decrease in the immunization levels among preschool children. Not only are more children susceptible to these diseases than before, but their susceptibility will continue through adulthood and may ultimately affect their children.[2] Millions of dollars each year are lost due to diseases which could have been prevented by immunization.[3] In response to such factors, in 1977 Director of DHEW, Joseph Califano, launched a nationwide drive to immunize at least 90% of children in the U.S. However, many health experts report continued evidence of children who are underimmunized. Some health professionals have suggested that the 1977 immunization drive produced statistical gains which are not reflected in actual improvements in immunization levels, particularly for lower socioeconomic status children.[4]

Immunization for children is an excellent example of arriving at a health care goal - the primary prevention rather than treatment of disease. Attempts to increase immunization levels have often used either of two methods of effecting primary prevention:[5] Population-wide intervention, and high risk intervention. In population-wide intervention, everyone in a given area is exposed to treatment. In high risk intervention, a small subgroup particularly at risk is treated.

Population Wide Prevention

Figure 1 illustrates a naturally occurring phenomena which periodically causes immunization to increase at a population-wide level. One important factor determining whether an individual obtains immunization for disease is the degree to which he or she feels susceptible to contracting the disease.[6] In this suggested cycle, high levels of immunization result in correspondingly fewer cases of a disease. With fewer cases of the disease available, individuals may feel they and their children are less susceptible. Thus, fewer immunizations are obtained. Because fewer individuals are protected, new cases of the disease begin to arise. The recent decrease in immunization and subsequent outbreaks of diphtheria in New York City children serves as one example.[7] Finally, the perception of increased susceptibility caused by new cases of the disease results in increasing levels of immunization. This naturally occurring cycle is obviously not a preferred strategy for increasing compliance to immunization levels - an intervention which did not involve an increase in reported disease would be far preferable.

Figure 2 illustrates the fluctuation of population-wide immunization - obtaining in Columbia City - Boone County Health Department (serving a city and rural catchment area of 87,000, located in Columbia, Missouri). A number of features of Figure 2 are noteworthy. First, the number of persons obtaining immunizations from January 1973 to September 1979 is steadily growing. Second, three large increases (in one case from an average number of less than

300 people immunized per month to 6753 people immunized in one month) can easily be seen. Two of these increases (March-April 1975, November 1977) resulted from free school immunization clinics. In cooperation with the school nurses, health department officials arranged for children's parents to sign releases for immunizations and return with the releases to the school clinic. Other recent research by Vernon and his colleagues[8] suggests this is an economical and powerful way to increase immunization levels, although chart audits and information to parents concerning the child's exact areas of susceptibility produced even more powerful effects in their study.

The third dramatic increase in Figure 2 of obtained immunizations can be noted on May 1977. This increase resulted from a county wide measles epidemic. Both increased susceptibility and increased accessibility to immunizations via clinics held at convenient locations contributed to this increase.

Another population-wide attempt at increasing immunization levels occurred during October 1973 and August 1978. The Department of Health, Education, and Welfare sponsored immunization drives during these months with multi-media participation. In August 1978, for example, public service advertisements discussing the need for childhood immunizations were shown several times a day on all three local television stations. These advertisements which also appeared on radio and in local newspapers ended with a plea

to contact a physician or the local health department. As can be seen in Figure 2, this population-wide intervention had little effect on immunization obtaining, at least within the city-county health department. The ineffectiveness of these mass media interventions is even more surprising when compared to the large gains in immunization levels obtained by school clinics and epidemic clinics which received far less media coverage.

High Risk Group Prevention

While it is possible to draw some conclusions retrospectively about the effectiveness of population-wide interventions, other methods of primary prevention better lend themselves to experimental investigation. If a high risk population could be pinpointed, variables used at a population-wide level could be controlled and examined. Free school clinics have effectively immunized individuals in a variety of age levels; they have been most successful at immunizing children of elementary school age. Since Missouri law requires school age children to be adequately immunized and since children are routinely screened for compliance with immunization schedules, they can (happily) currently not be regarded as a high risk group. However, preschool children are not required by law to be immunized, they are not a "captive" group as are school children,[2] nor do they routinely report to a central location where an immunization clinic could take place. Furthermore, preschool children are more at risk for childhood diseases; many health officials regard the preschool years as the critical period for immunizations.[7]

In addition, individuals of lower socioeconomic status exhibit less compliance to medical regimens in general than do individuals of middle or upper socioeconomic status[9] and they typically show lower levels of immunization.[10] Thus, the group of low socioeconomic class preschool children may be the group most at risk for the immunizable diseases. Perhaps the same techniques used with school children might be equally effective with lower socioeconomic preschool children. If not, new methods must be found to effect primary prevention in this group.

A chart audit of some of the files of lower socioeconomic class preschool children immunized at the Columbia City-Boone County Health Department yielded a sample of 144 underimmunized preschoolers. A plan similar to that used previously in school clinics was then put into effect. Attempts were made to contact the families of these children to inform them concerning the areas in which these children lacked immunizations and to arrange a clinic date for immunization to take place. Of the 144 families of children whose files were selected 23 had no current address or phone number and could not be contacted. Sixty-seven had an address but no phone number; letters were sent to these families stressing the importance of the children's obtaining immunizations and giving a free clinic date and set of appointment times. If the parents could not attend at the times listed, they were requested to call the health department. Twenty-five letters were returned with no forwarding address, it is assumed that the body of the remaining letters were received by the families.

None of the families to whom letters were sent attended the clinic or called for another appointment.

The remaining 54 families who had operating telephone numbers were repeatedly called - those who could not be reached by phone received letters. Thirty-two parents were reached by telephone; three refused to bring their child in for immunization, 6 noted that they had already obtained the necessary immunizations elsewhere, and the remaining 23 agreed to come to the immunization clinic. Only 14 of these families actually brought the preschooler to the health department for immunizations. Thus, the method of prompting and appointment arranging in a free clinic which had been very effective in immunizing school age children was found to be ineffective in increasing immunization status of about 90% of the lower socio-economic class preschool population. This finding came in spite of the use of a careful chart audit, written or verbal communication regarding the child's susceptibility to disease, and offers for appointment arranging - and in spite of increased appointment flexibility in comparison with the school clinics.

Active Factors in Prevention

Perhaps the most important message in the examination of these two levels of primary prevention is that it is not possible to make apriori predictions concerning the effectiveness of methods to increase complience to immunization schedules. While it is possible to greatly increase the number of immunizations given, techniques which might be expected to be effective (like the public service

media campaigns) may not impact prevention behavior. Furthermore, although it is possible to isolate effective techniques at a population-wide level, these techniques may not be equally effective with high risk populations.

Several of the important factors in obtaining compliance to immunization schedules are known. Becker and his colleagues,[6] for example, have proposed a Health Belief Model to explain the relatively low levels of public participation in preventive health programs such as screening and immunization. Basically, the Health Belief Model suggests that obtaining preventive health care, is determined by (1) the individual's "subjective state of readiness" which is made up of perceived susceptibility to disease and severity of consequences of contacting the disease and (2) the individuals "evaluation of preventive care effectiveness" or the perceived costs versus benefits of obtaining preventive care. This model is relevant both to the population-wide and to the high risk group approaches to prevention which have been discussed.

The effective population-wide techniques attempted to deal with both points of the Becker Model by specifying areas of continuing susceptibility to disease in addition to providing convenient, free immunizations. This resulted in successful intervention. Potentially, the Health, Education and Welfare public service advertisement either did not indicate each child's individual susceptibility and/or provide clear information about the location or cost of obtaining immunizations.

The efficacy of the information and appointment arranging for low socioeconomic status preschool children was limited by these and other factors. First, a large proportion of the population could not be reached at all by letter or telephone. While some of these families may have moved into another catchment area which then began providing service, census data suggest that most such families do not move from the catchment area. It is not clear how many school age as well as preschool children may be affected by the families changes in residence.

Second, both the written and verbal messages which were received outlined the individual child's susceptibility to disease. The verbal messages may have been much more effective than the written messages because of their individualized nature - the letters although filled in with the child's name and immunization status may have seemed like "form letters" which did not conote each child's unique susceptibility to disease.

Third, only 60% (14/23) of those parents agreeing to bring their children to the immunization clinic actually did so. Perhaps both letter and telephone prompting would have been more effective if it would have been possible to reduce the cost (in terms of time and effort) of obtaining immunizations. Contact with the families and lowered cost seemed to be the principal differences between the effective school clinics and the ineffective clinics held for low socioeconomic class preschoolers.

For the Future

Effecting primary prevention in health areas involves not only knowledge concerning ways of preventing the disease process, such as genetic screening, decreasing smoking, dental hygiene and obtaining

immunizations, but also methods of increasing patient compliance toward these preventive efforts. Decreasing immunization levels in recent years suggest an insensitivity to the continuing need to work toward compliance to immunization schedules.[11] Easy solutions such as public services media campaigns do not seem to provide the effectiveness they promise at first glance. Other methods such as providing clinics during epidemics and free school clinics which demand minimal parental effort appear highly successful in several areas where they have been attempted. Even these methods do not effectively attack immunization levels in high risk preschool children, however. Additional methods which depend more on lowering perceived cost/benefit ratio rather than simply pointing out children's susceptibility may be more successful. Some programs have actually sent a nurse to the home to insure that the child comes in for immunization,[12] however, this technique is prohibitively expensive and will still be ineffective with those families who do not have permanent addresses. New methods which may involve immunizing preschool siblings as well as school age children at school immunization clinics where temporary day care is provided or providing financial remuneration for parents of low socioeconomic class children may be feasible.

The task of preventing immunizable diseases is only half solved by making vaccines available. School and health authorities must continue to investigate innovative ways of gaining family compliance to immunization schedules if primary prevention is to be realized.

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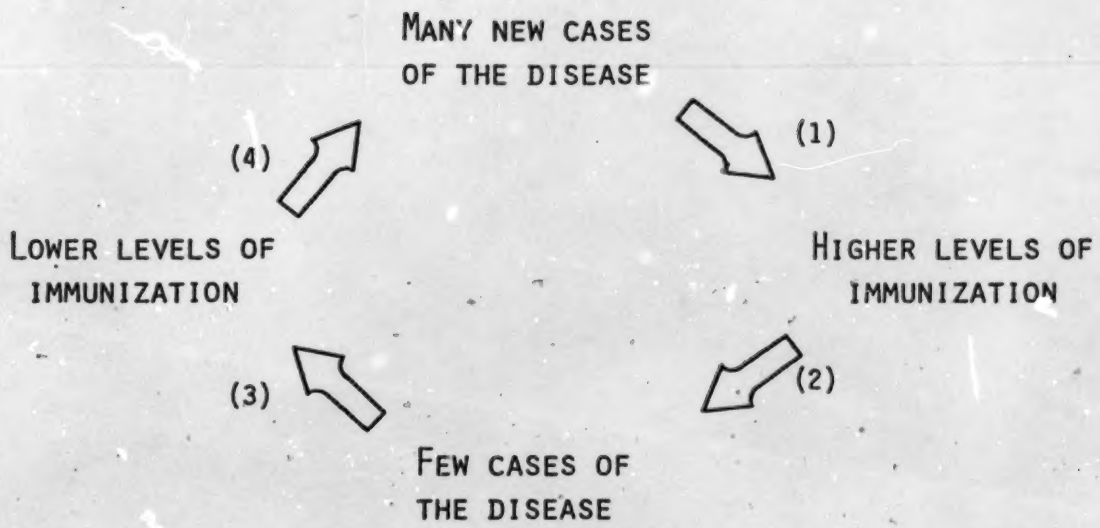
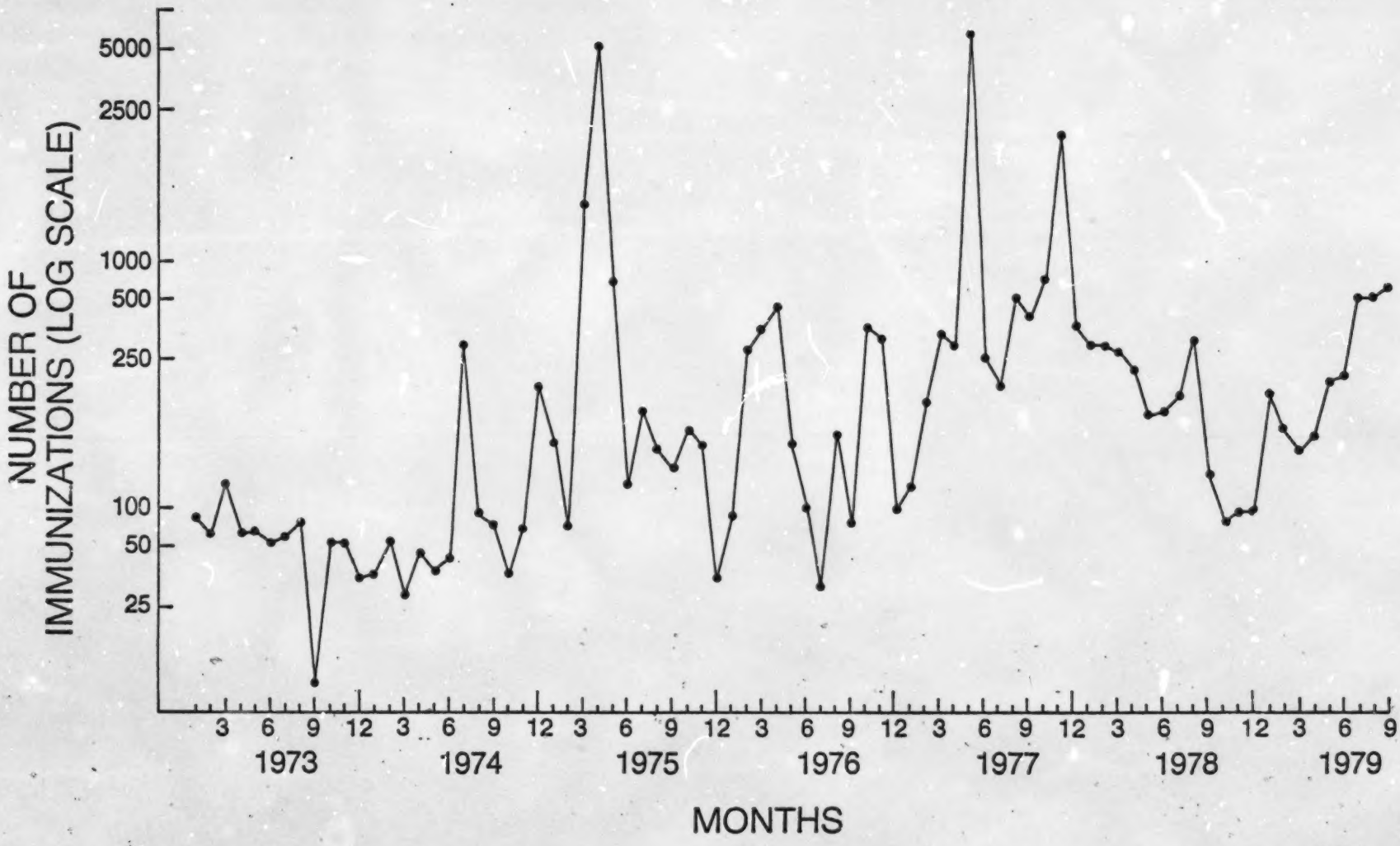
FIGURE 1

IMMUNIZATION MODEL




NUMBER OF IMMUNIZATIONS (LOG SCALE)
5000
2500
1000
500
250
100
50
25
3 6 9 12 3 6 9 12 3 6 9 12 3 6 9 12 3 6 9 12 3 6 9 12 3 6 9
1973
1974
1975
1976
1977
1978
1979
MONTHS